Institutional Entrepreneurship for Advancing Toxicogenomics in Ecological Risk Assessment: Bridging the Gap between Scientists and Regulators

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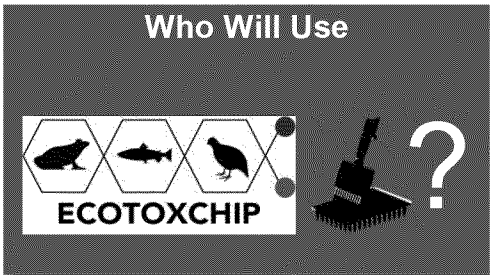
Context

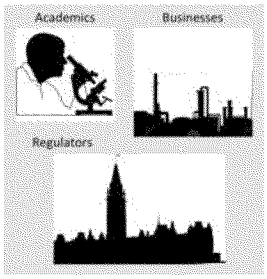
Our team is carrying out the "EcoToxChip" project, which aims to develop, test, and validate quantitative PCR-based arrays (EcoToxChips) for advanced toxicity testing. Within the project, the GE^{3}LS team produces and leverages social science knowledge to facilitate the adoption of EcoToxChips into standard practices.

GE^{3}LS = Genomics and its Ethical, Environmental, Economic, Legal, and Social Aspects.

EcoToxChips

Our team will produce two chips to be used in combination with an online data evaluation tool (EcoToxXplorer.ca). One chip will contain 384 prioritized genes for three standard lab species used worldwide in testing: fathead minnow, African clawed frog, and Japanese quail. The other chip will contain genes for three native species of commercial, recreational and aboriginal concern in Canada: rainbow trout, double-crested cormorant, and wood frog.





Question

Alternative toxicity testing methods, such as toxicogenomics, have been proposed for more than a decade as a solution to current regulatory risk assessment needs. However, the regulatory approach and toolkit for prioritizing chemicals and determining their ecological toxicity has remained for most part unaffected. **Why?**

Social Science Studies

1. Drawing Lessons from the Past

Toxicogenomics in human health regulation

- Interviews, content analysis, event history database

2. Drawing Lessons in Real-Time

Toxicogenomics in environmental regulation

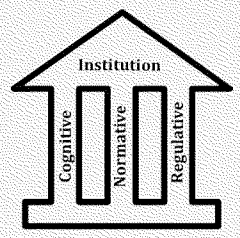
- Interviews, focus groups, participant observation, in situ ethnography

3. Forecasting the Future

Mapping the political, social, and economic implications of using toxicogenomics

- Delphi study, surveys, interviews, policy and network analysis

Institutional Entrepreneurship



The social processes underlying the adoption of new practices have long been of interest to social scientists. In particular, researchers have looked at how "institutionalized" practices – those which are widely established, often unquestioned and, hence, relatively stable over time – change. One mechanism is "institutional entrepreneurship", which represents "the activities of actors who have an interest in particular institutional arrangements and who leverage resources to create new institutions or to transform existing ones". From this perspective, ecological chemical risk assessment is an institutionalized field of professional practice that advocates of toxicogenomics seek to change through their entrepreneurial action.

Practices are especially difficult to change when supported by three institutional pillars: **cognitive** (i.e. actors think through, and construct reality with, existing practices, and thus have a difficult time imagining alternatives), **normative** (i.e. actors place a high social value on complying with existing practices) and **regulative** (i.e. government regulations as well as professional and organizational reward systems create material disincentives for deviating from existing practices).

Next Steps

- Key informant interviews with policy actors in Canada, USA, EU and OECD
- Mapping the institutional and stakeholder landscape in Canada, US, EU and OECD
- Media and document analysis to develop a chronology

Interested in Participating? We Need your Experience and Expertise!

If you are interested in being an interview partner, or a participant in a focus group or online Delphi study, or if you wish to comment on this poster, please contact us.

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Partner Organizations

- University of Saskatchewan
- Environment and Climate Change Canada
- US Environmental Protection Agency
- US Army Corps of Engineers
- Qiagen / SAB Biosciences
- Shell USA
- AXYS Analytical Services

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